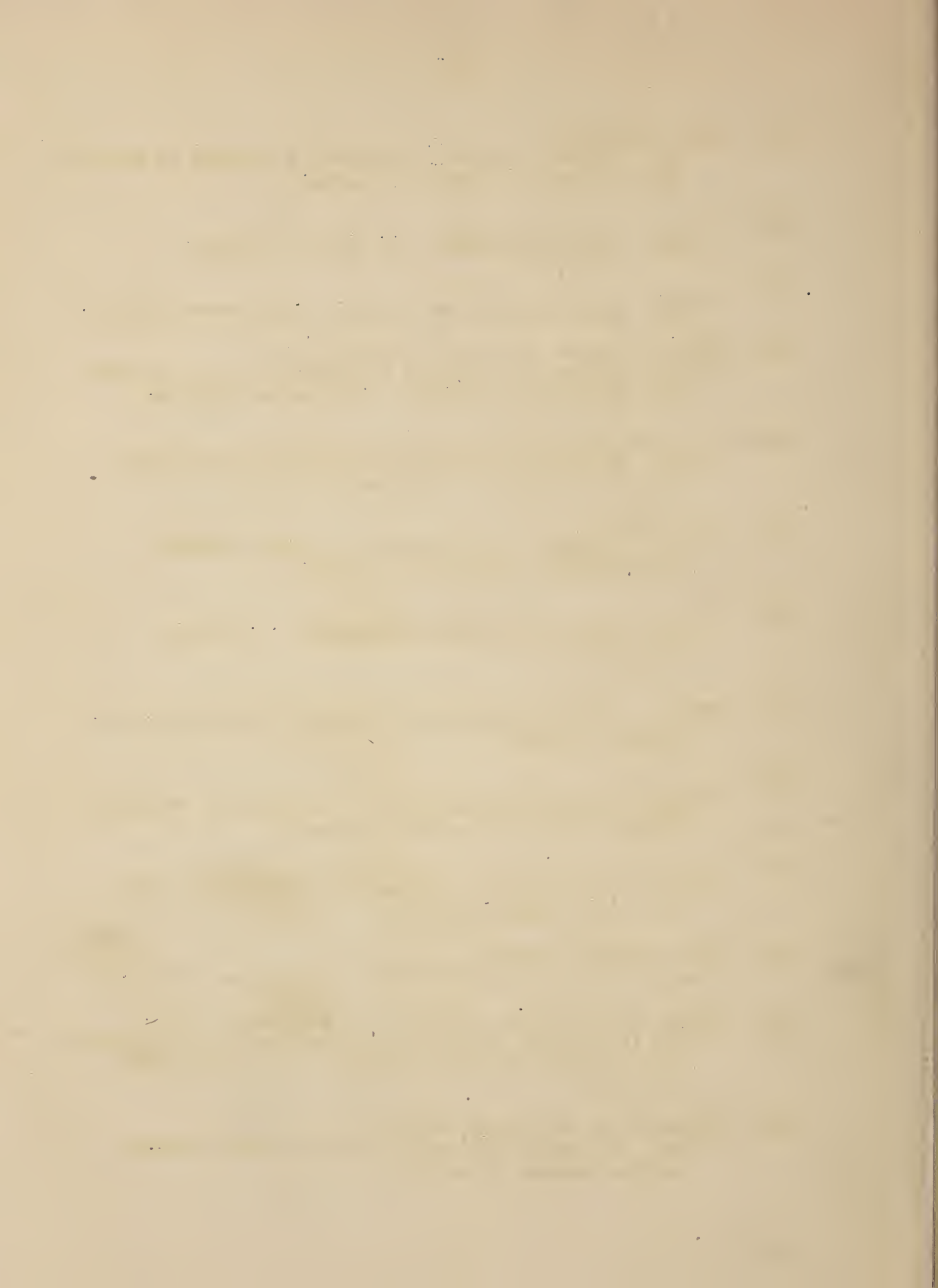


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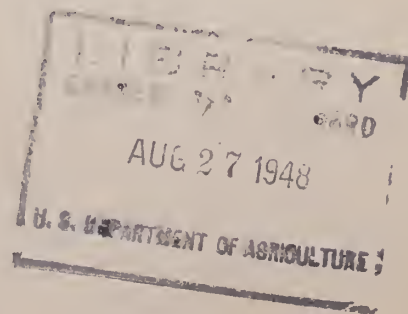


Eastern Regional Research Laboratory  
Philadelphia 18, Pennsylvania

PUBLICATIONS AND PATENTS  
OF THE  
EASTERN REGIONAL RESEARCH LABORATORY

1939 - 1947

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY  
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**Properties of Lactoprene EV.** Industrial and Engineering Chemistry, vol. 38, p. 960-967, September 1946.

Milling characteristics and physical properties of Lactoprene EV, a vulcanizable copolymer of 95 percent ethyl acrylate and 5 percent 2-chloroethyl vinyl ether, have been investigated. Tensile properties of lactoprene vulcanizates are well above a serviceable minimum, but the cured product exhibits low resilience. The product possesses two outstanding properties--resistance to oils and to dry heat. Its heat resistance is markedly superior to that of any of the present diene synthetics. In its resistance to organic solvents, Lactoprene EV compares favorably with butadiene-acrylonitrile copolymers.

- 193 Fein, M. L., and Fisher, C. H.

**Esters of Lactyllactic Acid.** Journal of the American Chemical Society, vol. 68, p. 2631-2632, December 1946.

Several esters of dimeric lactic acid (lactyllactic acid) were made in high yields by treating certain lactic esters with alpha-acetoxypriponyl chloride. This method is generally suitable for the preparation of acyl derivatives of alkyl lactyllactates. Satisfactory preparation of the intermediate lactic esters and of alpha-acetoxypriponyl chloride is described. Because of their low vapor pressures and solubilizing ester groups, esters of lactyllactic acid merit attention as potential plasticizers for cellulose acetate, ethyl cellulose, and other commercially important resins.

- 194 Gordon, William G., Brown, Alfred E., and Jackson, Richard W.

**Higher Fatty Acid Derivatives of Proteins.** Industrial and Engineering Chemistry, vol. 38, p. 1239-1242, December 1946.

A series of novel fatty acid derivatives of proteins, prepared by the reaction of acid chlorides with proteins dissolved in aqueous alkali, is described. The influence of a number of experimental variables on the extent of acylation was investigated. The preparative procedure adopted readily gives derivatives of casein which are acylated to the extent of approximately 20 percent by substituent groups ranging from caprylyl to stearyl. This procedure was also used for the preparation of palmitoyl derivatives of egg albumin, zein, wheat gluten, and soybean, peanut and cottonseed proteins. Physical and chemical properties of a representative derivative, palmitoyl casein, are discussed. Among noteworthy characteristics of the acylated products are their reduced affinity for water and their altered solubilities.

- 195 Gordon, William G., Brown, Alfred E., McGrory, Clare M., and Gell, Edith C.

**Plastic Properties of Higher Fatty Acid Derivatives of Proteins.**  
Industrial and Engineering Chemistry, vol. 38, p. 1243-1245,  
December 1946.

Modification of casein by higher fatty acid residues yields materials which in certain respects are superior to the unmodified protein as plastic molding powders. Progressively higher acylation affects the plastic properties of casein as follows: Water absorption is reduced; plastic flow in the presence of 6 to 12 percent water as plasticizer is improved; tensile and flexural strengths are decreased. It is concluded that a moderate degree of acylation followed by a short treatment with formaldehyde results in the best overall combination of properties. In the case of palmitoyl zein, hardening with formaldehyde is unnecessary, and the product has an unusually low water absorption. Test pieces molded from moderately acylated casein are relatively stable in dimensions, have A.S.T.M. water absorptions of 5 to 6 percent in 24 hours, tensile strengths of 5000-6000 pounds per square inch, and flexural strengths of the same order of magnitude.

- 196 Halwer, M., and Nutting, G. C.

**Cysteine Losses Resulting From Acid Hydrolysis of Proteins.** Journal of Biological Chemistry, vol. 166, p. 521-530, December 1946.

Cysteine determinations made by the often-used acid hydrolysis method are shown to be of doubtful value, since added cysteine cannot be completely recovered. Carbohydrate in the samples accounted for part of the loss, but a carbohydrate-free protein also showed incomplete recovery.

- 197 Hamilton, R. M., and Yanovsky, E.

**Allyl Ethers of Carbohydrates. IV. Mixed Allyl Ethers of Starch.** In Industrial and Engineering Chemistry, vol. 38, p. 864-866, August 1946.

A number of mixed ethers of starch containing both allyl and saturated alkyl groups have been prepared. These ethers do not contain free hydroxyl groups, and some of them are soluble in aliphatic hydrocarbons, in which the previously described allyl starch is insoluble.

- 198 Knight, H. B., Jordan, E. F., Jr., and Swern, Daniel

**Identification of The Linoleic And Linolenic Acids of Beef Tallow.**  
Journal of Biological Chemistry, vol. 164, p. 477-482, July 1946.

By use of the tetra- and hexa-bromide techniques, evidence is presented that the nonconjugated octadecadienoic and trienoic acids of beef tallow consist mainly of cis,cis-9,12-linoleic acid and cis,cis,cis-9,12,15-linolenic acid, respectively.

- 199 Luddy, F. E., and Riemenschneider, R. W.

**Determination of Tri-Saturated Glycerides in Lard, Hydrogenated Lard, And Tallow.** Oil and Soap, vol. 23, p. 385-389, December 1946.

Crystallization conditions are described which are suitable for estimation of the tri-saturated glycerides in lard, hydrogenated lard, and tallow. The chief advantage of the method is that it requires much less time than previous methods.



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Nicotine Insecticides. Part II. Search for Activator. E-709, December 1946. (Bureau of Entomology and Plant Quarantine "E" Series.) (Processed.)  
One hundred compounds considered as possible synergists for nicotine were tested on from 2 to 8 species of insects. None of the adjuncts increased the insecticidal action of the nicotine compounds sufficiently to merit further study.
- 201 Milleville, Howard P., and Eskew, Roderick K.  
Recovery of Volatile Apple Flavors in Essence Form. Western Canner and Packer, vol. 38, p. 51-54, October 1946.  
A process is described for the recovery of the volatile aromatic flavoring constituents of apple juice. Basic data and a flow diagram are shown for production equipment designed to recover this apple essence from 1,000 gallons of apple juice per hour at 150 times its concentration in the original juice.
- 202 Mottern, H. H., and Hills, Claude H.  
Low-Ester Pectin From Apple Pomace. Industrial and Engineering Chemistry, vol. 38, p. 1153-1156, November 1946.  
A simplified procedure is described for the preparation of low-ester pectin from apple pomace. Tomato pectase is used as the deesterification catalyst. The essential steps in the process are (a) polyphosphate extraction, (b) filtration and concentration of the pectin extract, (c) simultaneous deesterification and starch removal, (d) enzyme inactivation, and (e) precipitation of the product with alcohol. The proposed process is rapid and easily controlled and requires only minor changes in the usual procedure for pectin manufacture.
- 203 Nichols, P. L., Jr., Wrigley, A. N., and Yanovsky, E.  
Allyl Ethers of Carbohydrates. V. Preparation and Polymerization of beta-Methallyl Ethers. Journal of the American Chemical Society, vol. 68, p. 2020-2022, October 1946.  
A number of beta methallyl ethers were prepared, such as methallyl ethers of sucrose, mannitol, sorbitol, pentaerythritol, dipentaerythritol, glycerol, ethylene glycol, and starch. The rates of oxidation and gelation times of the methallyl ethers were determined. It was found that the rate of oxidation is somewhat higher for methallyl ethers than for the corresponding allyl ethers. On the other hand, the gelation time is longer for the methallyl ethers.
- 204 Nutting, G. C., Halwer, M., Copley, M. J., and Senti, F. R.  
Relationship Between Molecular Configuration and Tensile Properties of Protein Fibers. Textile Research Journal, vol. 16, p. 599-608, December 1946.  
Artificial ovalbumin fibers were compared with the natural fibers horsehair, wool, collagen, and silk. All fibers showed basic similarity with regard to the effect of state of orientation. The parallel between the artificial fibers and the keratins was especially close.

205 Rehberg, C. E.

**Allyl Lactate.** Organic Syntheses, vol. 26, p. 4-6, 1946. John Wiley and Sons, Inc., New York; Chapman and Hall, Ltd., London.

The detailed experimental procedure, with notes, for preparing allyl lactate is given.

206 Rehberg, C. E.

**n-Butyl Acrylate.** Organic Syntheses, vol. 26, p. 18-21, 1946. John Wiley and Sons, Inc., New York; Chapman and Hall, Ltd., London.

The detailed experimental procedure for preparing n-butyl acrylate by alcolysis of methyl acrylate with butanol is given.

207 Riemenschneider, R. W., Luddy, Francis E., Swain, Margaret L., and Ault, Waldo C.

**Fractionation of Lard and Tallow by Systematic Crystallization.** Oil and Soap, vol. 23, p. 276-282, September 1946.

Lard and edible tallow were subjected to a series of fractional crystallizations from acetone at temperatures ranging from 20° to -45° C. Six recrystallized precipitate fractions and a filtrate residue were obtained from each fat. The physical and chemical characteristics of each fraction were determined and compared.

208 Senti, F. R., and Witnauer, L. P.

**Oriented Filaments of Amylose and Alkali Amylose.** Journal of the American Chemical Society, vol. 68, p. 2407-2408, November 1946.

Lithium, sodium, potassium and cesium hydroxide amylose giving excellent fiber diagrams are produced on deacetylation of clamped, oriented filaments of amylose triacetate in 0.3 N alkali solution in 75 percent methanol or ethanol. Unit cell (orthorhombic) dimensions of potassium hydroxide amylose are  $a_0 = 9.0 \text{ \AA}$ ,  $b_0 = 22.7 \text{ \AA}$  (fiber period), and  $c_0 = 12.7 \text{ \AA}$ . Transformation of the alkali amylose structure to the V structure (fiber repeat period 8  $\text{\AA}$ ) is effected by removal of alkali in aqueous alcohol solution. Exposure of alkali amylose to high humidity (80 percent) for several days gives the A (cereal starch) structure with a fiber repeat period of 10.5  $\text{\AA}$ . In saturated water vapor, the A structure changes to the B (tuber starch) structure.

209 Stuart, L. S.

**Changes in Green Salted Calfskin Cured Under Aerobic And Anaerobic Conditions.** Journal of the American Leather Chemists Association, vol. 41, p. 359-376, August 1946.

Studies were conducted to determine the effect of oxygen on the development of butyric-propionic acid odors, on bacterial growth, on chemical changes, and on formation of grain stains during the salt curing of hides. From the data obtained, it appears that butyric-propionic odors, pronounced acid reaction, comparatively few bacteria, and slight loss of hide substance are characteristic of anaerobic cures, whereas strong ammoniacal odors, alkaline reaction, high bacterial count, and comparatively large loss of hide substance characterize aerobic cures. Evidence suggests that salted calfskins cured anaerobically may be susceptible to staining by the subsequent growth of aerobic microorganisms, especially when blood is present.

- 210 Swern, Daniel, Billen, Geraldine N., and Scanlan, John T.  
Hydroxylation and Epoxidation of Some 1-Olefins With Per-Acids.  
Journal of the American Chemical Society, vol. 68, p. 1504-1507,  
August 1946.  
Six straight-chain 1-olefins when hydroxylated with hydrogen peroxide  
in formic acid solution gave good yields of the corresponding 1,2  
glycols. Only 1.025 to 1.05 moles of hydrogen peroxide were required  
per mole of olefin. When epoxidized with peracetic acid in acetic  
acid solution, the same olefins gave only fair yields of the corres-  
ponding 1,2-epoxides.
- 211 Swern, Daniel, Jordan, E. F., Jr., and Knight, H. B.  
Unsaturated Alcohol Esters of The 9,10-Dihydroxystearic Acids. Prepa-  
ration of Elaidyl Alcohol. Journal of the American Chemical  
Society, vol. 68, p. 1673-1674, August 1946.  
The allyl, methallyl, beta-chloroallyl, furfuryl, oleyl, elaidyl and  
cinnemyl esters of both high-melting and low melting forms of dihy-  
droxy acids are described. Two procedures for preparing elaidyl alco-  
hol are also described. Some of the esters appear to be good plasti-  
cizers for cellulose-type plastics.
- 212 Willits, C. O., Ogg, C. L., Porter, W. L. and Swain, M. L.  
Determination of Rubber in Fleshy And Woody Tissue Plants. Journal of  
the Association of Official Agricultural Chemists, vol. 29, p. 370-  
387, November 1946.  
A procedure is presented for the determination of rubber in kok-saghyz  
roots, cryptostegia leaves and similar fleshy plant material. Modifi-  
cations of the Spence Caldwell method are recommended for the analyses  
of guayule and other woody plants. Directions are given for the prep-  
aration of laboratory samples of these plants, including grinding pro-  
cedures, sampling techniques for both the gross and laboratory sam-  
ples, and recommended methods for moisture determination.
- 213 Willits, C. O., Swain, M. L., and Ogg, C. L.  
Determination of Rubber Hydrocarbon By a Gravimetric Rubber Bromide  
Method. Industrial and Engineering Chemistry, Analytical Edition,  
vol. 18, p. 439-442, July 1946.  
A direct method is given for determining rubber hydrocarbon in ex-  
tracts from plant tissues, and in rubber crudes, latices, and liquors.  
Gravimetric factors are established for converting weight of rubber  
bromide to weight of rubber, when the source is guayule, cryptostegia  
or kok-saghyz.



1946

July - December

Patents

COPIES OF PATENTS MAY BE PURCHASED FROM THE UNITED STATES PATENT OFFICE, WASHINGTON 25, D. C.
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Filachione, Edward M., and Fisher, Charles H.

Process of Manufacturing Volatile Esters of Hydroxy Carboxylic Acids.

U.S. Patent No. 2,405,646, issued August 13, 1946.

Hamilton, Robert M., and Nichols, Peter L., Jr.

Preparation of Organic Solvent-Soluble Unsaturated Carbohydrate Ethers and Products Produced Thereby.

U.S. Patent No. 2,406,369, issued August 27, 1946.

Hoover, Sam R., Allen, Paul J., and Naghski, Joseph

Guayule Rubber By Fermentation. U.S. Patent No. 2,408,853, issued October 8, 1946.

Nichols, Peter L., Jr., and Hamilton, Robert M.

Preparation of Starch Ethers. U.S. Patent No. 2,405,973, issued August 20, 1946.

Nichols, Peter L., Jr., Meiss, Philip E., and Yanovsky, Elias

Method For Preparing Soluble Allyl Starch. U.S. Patent No. 2,413,463, issued December 31, 1946.

Ratchford, William P., and Fisher, Charles H.

Improved Process For The Manufacture of Methyl Acrylate By The Thermal Decomposition of Methyl alpha-Acetoxypionate.

U.S. Patent No. 2,408,177, issued September 24, 1946.

Rehberg, Chessie E.

Azeotropic Distillation of Methanol From Admixture With Acrylic Esters.

U.S. Patent No. 2,406,561, issued August 27, 1946.

Rehberg, Chessie E., and Fisher, Charles H.

Allyl and Methallyl Esters of Lactic And alpha-Acetoxypionic Acids.

U.S. Patent No. 2,410,551, issued November 5, 1946.

Swern, Daniel

9,10-Epoxyoctadecanol And Process For Its Preparation.

U.S. Patent No. 2,411,762, issued November 26, 1946.

Wells, Percy A., and Swern, Daniel

Derivatives of Isoascorbic Acid. U.S. Patent No. 2,408,182, issued September 24, 1946.

Wells, Percy A., and Swern, Daniel

Derivatives of Isoascorbic Acid. U.S. Patent No. 2,408,897, issued October 8, 1946.

1947

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Publications

214 Anonymous

Firming Apple Slices. AIC-153, April 1947. (Processed )

Calcium chloride may be used for firming summer and early fall varieties of apples to be used in pies. Fresh, canned, or frozen slices can be treated by making only slight changes in present processing methods. The concentration of calcium chloride depends on the variety, stage of maturity, and method of application.

215 Cordon, T. C.

Some Observations Concerning Methods For Testing Resistance of Leather To The Growth of Fungi. Journal of the American Leather Chemists Association, vol. 42, p. 302-312, June 1947.

The proposed American Leather Chemists Association method for testing the resistance of leather to mold growth is discussed, and reasons are given for each step in the procedure. The advantages of the method, namely, that it duplicates essential conditions of natural exposure and can be used with a minimum of laboratory equipment and mycological training, are pointed out.

216 Cordon, T. C., Beebe, C. W., and Rogers, J. S.

Canaigre Investigations. III. An Improved Method of Extraction. Journal of the American Leather Chemists Association, vol. 42, p. 118-128, March 1947.

A method for extracting tannin from canaigre has been devised which gives yields much higher than those obtained with the current leaching procedures normally used for other materials. It consists in wet pulping and mixing under controlled temperature conditions and removing the liquor from the solids by centrifugal separation. As far as can be judged from these tests, this process could be readily adapted to plant scale operation.

217 Cordon, T. C., Beebe, C. W. and Rogers, J. S.

Canaigre Investigations. IV. Fermentation of Liquors For The Production of High Purity Extracts. Journal of the American Leather Chemists Association, vol. 42, p. 128-136, March 1947.

A procedure is given for the fermentation of high-nontannin, low-purity, canaigre liquors. By this procedure, tanning extracts containing 65 percent tannin and having purities of 70 have been prepared. Such extracts are suitable for tanning firm, heavy leather.

218 Couch, James F.

Rutin For The Capillaries. Science in Farming. Yearbook of Agriculture, 1943-47, p. 711-715, 1947.

The story of rutin is presented, including a discussion of its chemical structure, isolation from tobacco and other plants, discovery of its medical value, and chemical investigations leading to its present commercial production from buckwheat.

- 219 Hills, Claude H., and Mottern, H. H.  
The Properties of Tomato Pectase. *Journal of Biological Chemistry*, vol. 168, p. 651-663, May 1947.  
Data are presented on the preparation and properties of tomato pectase. A comparison of tomato pectase and the pectases from alfalfa and citrus peel shows sufficient difference in properties to indicate their nonidentity.
- 220 Hills, Claude H., and Willaman, J. J.  
Research Develops New Products From Apples. *Journal of the New Hampshire Horticultural Society*, vol. 10, p. 45-55, 1947.  
The importance of developing a diversified apple byproducts industry is stressed. The versatility of apples as a source of byproducts is illustrated by means of a chart outlining 17 commercial products and 2 potential ones. Recent research on such products as apple juice, sirup, essence, frozen slices, pomace, pectin, and firmed apple slices is described briefly.
- 221 Hoover, Sam R., and Kokes, Elsie L. C.  
The Effect of pH Upon Proteolysis By Papain. *Journal of Biological Chemistry*, vol. 167, p. 199-207, January 1947.  
Papain hydrolyzes approximately 25 percent of the peptide bonds of casein at pH 7, the pH optimum for the initial rate of hydrolysis. Under comparable conditions at pH 5, the hydrolysis of 50 percent of the peptide bonds with the release of 30 percent of the amino acids as free amino acids is observed. Three synthetic peptide substrates with different side groups are hydrolyzed at an optimum rate at pH 5.0 - 5.5.
- 222 Knight, H. B., Jordan, E. F., and Swern, Daniel  
Esters of Long-Chain, Hydroxy Aliphatic Acids. *Journal of the American Chemical Society*, vol. 69, p. 717-718, March 1947.  
The properties of three new esters, namely, 9,10-dihydroxyoctadecyl 12-hydroxystearate, 9,10-dihydroxyoctadecyl 9,10,12-trihydroxystearate, and tetrahydrofurfuryl 9,10-dihydroxystearate, are given.
- 223 Mast, W. C., Dietz, T. J., Dean, R. L., and Fisher, C. H.  
Lactoprene EV Elastomer Curing Recipes and Properties. *India Rubber World*, vol. 116, p. 355-360, June 1947.  
The vulcanization of saturated acrylic resins and the compounding, curing, properties, and potential applications of Lactoprene EV (copolymer of 95 percent ethyl acrylate and 5 percent 2-chloroethyl vinyl ether) are reviewed and discussed. A number of experimental curing recipes are presented, with a view to demonstrating the comparative effectiveness of various agents in curing Lactoprene EV. The properties and potential uses of lactoprene are compared with those of GR-S, now produced in large quantities as a large-volume, general-purpose synthetic rubber.

234 Senti, Frederic R.

The Structure of Protein Fibers. American Dyestuff Reporter, vol. 36, p. 230-237, May 5, 1947.

This paper discusses the relation between the structure of protein fibers as revealed by X-ray studies and the physical properties of the fibers.

235 Speiser, R., Copley, M. J., and Nutting, G. C.

Effect of Molecular Association and Charge Distribution on The Gelation of Pectin. Journal of Physical and Colloid Chemistry, vol. 51, p. 117-133, January 1947.

The solubility of pectic materials is an index to their gel-forming ability. Solubility in general decreases with the degree of esterification ( $\gamma$ ). Enzyme-deesterified pectinic acids, because of their higher content of non-uronide material, are more soluble than acid-deesterified pectinic acids. The quantity of divalent ion ( $\text{Ca}^{++}$ ) necessary to form a gel of a given strength decreases with  $\gamma$ , reflecting the increased possibility of forming cross links between carboxyl groups of adjacent pectinic acid molecules. Electrophoresis diagrams for acid- and enzyme-deesterified pectinic acids show the latter to be more heterogeneous in the distribution of  $\gamma$  among its molecules. This heterogeneity is principally responsible for the low strength of gels made from enzyme-deesterified pectinic acids. Calcium pectinate gels are characteristically brittle, as compared with hydrogen-bonded pectinate gels.

236 Swern, Daniel, Findley, Thomas W., Billen, Geraldine N., and Scanlan, John T.

Determination of Oxirane Oxygen. Analytical Chemistry, vol. 19, p. 414-415, June 1947.

A general procedure for the determination of oxirane oxygen is described which is based on the quantitative opening of the oxirane ring by means of a 0.2 N solution of anhydrous hydrogen chloride in absolute ethyl ether. The method is specific for the determination of oxirane oxygen; it may be employed in the analysis and determination of the purity of a wide variety of oxirane compounds; and it is suitable for the determination of oxirane oxygen in air oxidation reaction mixtures.

237 Talley, E. A., Hamilton, R. M., Schwartz, J. H., Brown, C. A., and Yanovsky, E.

Preparation of Allyl Starch. AIC-140, February 1947. (Processed.)

Also in Tappi Bulletin, July 31, 1947.

Previously described methods for preparing the allyl ether of starch (a new resin that dissolves in organic solvents, and on exposure to air forms an insoluble film) are uneconomical, since a large excess of allyl chloride is required. Because of the promising results obtained with allyl starch in the coating and plastic fields, the preparation of this allyl ether has been studied further. Several improved and efficient methods, which should facilitate the industrial use of the product, are described.



238 Wells, P. A.

The Eastern Regional Research Laboratory. Tappi Bulletin, January 6, 1947.

The background, organization, and some of the accomplishments of the Eastern Regional Research Laboratory are briefly discussed.

239 Willaman, J. J., and Eskew, R. K.

Uses For Vegetable Wastes. Science in Farming. Yearbook of Agriculture 1943-47, p. 739-743, 1947.

A summary of the production of leaf meals, their composition, and their use in poultry feeds.

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Patents

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Fein, Martin L., and Fisher, Charles H.

Process For Purifying Acrylic Esters.

U.S. Patent No. 2,414,589, issued January 21, 1947.

Filachione, Edward M., and Fisher, Charles H.

Purification of Lactic Acid.

U.S. Patent No. 2,420,234, issued May 6, 1947.

Rehberg, Chessie E., and Fisher, Charles H.

Production of Acrylic Acid.

U.S. Patent No. 2,413,889, issued January 7, 1947.

Smith, Claude R.

Oil-Soluble Copper-Nicotine Compounds and Process of Preparing Same. U.S.

Patent No. 2,414,213, issued January 14, 1947.

## July - December

## Publications

240 Anonymous

**Tanners Who Have Advised The Eastern Regional Research Laboratory That They Will Tan One or a Few Hides or Skins Into Leather or Furs For Farmers or Others.** Chemistry List No. 7, July 1947. (Processed.) A list of names and addresses of 30 tanning organizations, located in 16 states, that have indicated their willingness to tan a few hides or skins into leather or fur for individuals. It shows the types of skins tanned and leathers made, and whether tannage is paid for in cash or is exchanged for skins.

241 Anonymous

**Acrylic Rubber Available.** Chemical and Engineering News, vol. 25, p. 3238, November 3, 1947.

A brief description of Lactoprene EV (a copolymer of 95 percent ethyl acrylate and 5 percent 2-chloroethyl vinyl ether) and its properties is given. The availability of experimental quantities of this acrylic rubber from pilot-plant production at the government laboratories operated by the University of Akron and at the Eastern Regional Research Laboratory is announced.

242 Ault, Waldo C., and Swain, Margaret L. (ERRL), and Curtis, Lawrence C. (University of Connecticut)

**Oils From Perennial Gourds.** Journal of the American Oil Chemists' Society, vol. 24, p. 289-290, September 1947.

Analytical data are given pertaining to the seed as well as oil from the seed of two perennial gourds, *Cucurbita palmata* and *Cucurbita digitata*, which grow wild in arid regions of the Southwestern States. The most unusual feature of the oils is the presence of about 10.0 to 20.0 percent of a conjugated trienoic acid.

243 Ault, Waldo C., Weil, James K., and Nutting, George C. (ERRL), and Cowan, J. C. (Northern Regional Research Laboratory)

**Direct Esterification of Gallic Acid With Higher Alcohols.** Journal of the American Chemical Society, vol. 69, p. 2003-2005, August 1947.

A procedure for the direct esterification of gallic acid with the higher normal aliphatic alcohols is described. Yields of lauryl gallate of the order of 70-80 percent of the theoretical yield (based on the gallic acid used) are obtained.

244 Badgett, C. O.

**Nicotinic Anhydride.** Journal of the American Chemical Society, vol. 69, p. 2231, September 1947.

A simplified method for the preparation of nicotinic anhydride from nicotinic acid is described. In this process, distillation procedures are eliminated, and the anhydride is crystallized from the liquid portion of the reaction mixture. Excellent yields of essentially pure product are obtained.

- 245 Badgett, C. O., and Woodward, C. F.  
Nicotinic Acid. Miscellaneous Esters. Journal of the American Chemical Society, vol. 69, p. 2907, November 1947.  
Nine new miscellaneous esters of nicotinic acid have been prepared by the reaction of the appropriate hydroxy compound with either nicotinyl chloride hydrochloride or nicotinic acid anhydride.
- 246 Buck, R. E., and Mottern, H. H.  
l-Malic Acid as Byproduct in The Manufacture of Apple Sirup by The Ion Exchange Process. Industrial and Engineering Chemistry, vol. 39, p. 1087-1090, September 1947.  
The l-malic acid adsorbed on an anion exchanger in the preparation of a bland apple sirup can be recovered from the effluent from the sodium carbonate regeneration of the exchanger. Only a slight modification is necessary in the regular regenerative procedure to recover what would otherwise be waste material. The acid is obtained in the regenerant effluent as the soluble sodium salt, precipitated as the normal calcium salt, and converted to the free acid by double decomposition with sulfuric acid.
- 247 Clarke, I. D., and Luvisi, F. P.  
A Condenser and a Water Heater for Analytical Tannin Extractors. Journal of the American Leather Chemists Association, vol. 42, p. 364-367, July 1947.  
A description is given of a metal-jacketed glass condenser and a steam operated water heater for use in the analytical extraction of tanning materials.
- 248 Couch, J. F., Krewson, C. F., and Naghski, J.  
Extraction and Refining of Rutin From Green Buckwheat. AIC-160, July 1947. (Processed.)  
Practical directions are given for producing pure rutin from fresh buckwheat plants on a commercial scale. Comments on the various steps are included to clarify the directions.
- 249 Fontaine, Thomas D., Ma, Roberta, and Poole, Janet B. (Biologically Active Chemical Compounds Division, Beltsville, Md.), and Porter, William L., and Naghski, Joseph (ERRL)  
Isolation of Rutin From Tomatin Concentrates. Archives of Biochemistry, vol. 15, p. 89-93, October 1947.  
A measurable amount of rutin is present in the leaves of the Red Currant tomato plant (*Lycopersicon pimpinellifolium*). Rutin crystallizes readily from chromatographic fractions having high tomatin activity, but rutin does not inhibit the organism (*Fusarium oxysporum* f. *lycopersici*) used for tomatin assay nor does its presence in solution with tomatin appear to influence the assay for tomatin.
- 250 Griffin, E. L., Talley, Florence B., and Heller, Margaret E.  
Comparison of The Essences From Nine Varieties of Apples. Fruit Products Journal and American Food Manufacturer, vol. 27, p. 4, 5, and 27, September 1947.  
Apple essence was prepared from nine varieties of apples and incorporated into candy, jelly, and reconstituted juice. A detailed comparison was made of the essences in these final products.



- 251 Heller, Margaret E. (ERRL), Nold, Truman (National Apple Institute), and Willaman, J. J. (ERRL)  
**Survey of Apple Juice Packed in 1946.** AIC-161, September 1947.  
(Processed.) Also in The Fruit Products Journal and American Food Manufacturer, vol. 27, p. 27, 77-79, 87 and 89, November 1947.  
Twenty-nine producers submitted 36 samples of apple juice, which represented 10,776,000 gallons. The average flavor rating was lower than in 1940 and 1941. This may have been due in some degree to the greater age of the samples when judged and to the lower density of the 1946 juices. Better quality of apples and lower storage temperatures for the juice are recommended.
- 252 Hills, Claude H., Nevin, Charles S., and Heller, Margaret E.  
**Firming Apple Slices.** Fruit Products Journal and American Food Manufacturer, vol. 26, p. 356-362 and 379, August 1947.  
Calcium chloride may be used to firm fresh, canned, or frozen apple slices, the concentration required depending on the variety, stage of maturity, and method of application. Several improved commercial procedures for firming slices are described which require only slight changes in the present methods of processing.
- 253 Hoover, Sam R., and Mellon, Edward F.  
**Effect of Acetylation Upon Sorption by Cellulose.** Textile Research J., vol. 17, p. 714-716, December 1947.  
Published water absorption data of Sheppard and Newsome have been recalculated on the basis of their cellulose content. The sorption of cellulose is essentially unchanged by acetylation.
- 254 Morris, Steward G., Kraekel, Lillian A., Hammer, Dorothy, Myers, J. S., and Riemenschneider, R. W.  
**Antioxidant Properties of The Fatty Alcohol Esters of Gallic Acid.** Journal of the American Oil Chemists' Society, vol. 24, p. 309-311, September 1947.  
The antioxidant properties of octyl, dodecyl, tetradecyl, hexadecyl, and octadecyl gallates in fat substrates were determined by the Swift stability test. The carry-over of the antioxidant properties into baked goods was determined by storage tests on piecrust at 38° C. (100° F.) and 63° C. (145° F.).
- 255 Nichols, P. L., Jr., and Yanovsky, E.  
**Allyl Sucrose: A New Industrial Use For Sugar.** Sugar, vol. 42, p. 28, 29, and 38, September 1947.  
Various methods of preparing allyl sucrose are described. Oxidation and polymerization in the presence of oxygen was studied. Time of gelation with and without a catalyst was determined. The formation of insoluble and infusible resins on gradual oxidation and polymerization of allyl sucrose leads to the suggestion that the monomer be used for the coating of wood, metal, and other surfaces. On "curing," this coating becomes resistant to solvents, oils, and temperatures up to 200° C.

- 256 Porter, W. L., Brice, B. A., Copley, M. J., and Couch, J. F.  
Tentative Spectrophotometric Method For The Determination of Rutin in  
Various Preparations. AIC-159, July 1947. (Processed.)

The spectrophotometric method outlined is intended for the determination of rutin in crude and purified rutin preparations and in pharmaceutical tablets, and the determination of quercetin and pigment impurities in such materials.

- 257 Ratchford, W. P., and Fisher, C. H.  
Preparation of N,N-Dimethylacrylamide By Pyrolysis of N,N-Dimethyl-  
alpha-Acetoxypropionamide. Journal of the American Chemical  
Society, vol. 69, p. 1911-1914, August 1947.

Dimethylamine reacted readily with methol lactate, N,N-dimethyl lactamide being formed in high yield. Treatment of the dimethyl lactamide with acetic anhydride yielded the acetyl derivative, N,N-dimethyl alpha-acetoxypropionamide. N,N-Dimethyl alpha-acetoxypropionamide resembled methyl alpha-acetoxypropionate in that thermal decomposition yielded acetic acid and the corresponding acrylic acid derivatives. Pyrolysis affords a convenient method of converting lactic acid, through the acetyl derivative of N,N-dimethyl lactamide, into N,N-dimethylacrylamide. The dimethylacrylamide polymerized readily, yielding a hard, transparent, water-soluble polymer. Aqueous solutions of the polymeric N,N-dimethylacrylamide were viscous.

- 258 Rehberg, C. E., Dixon, Marion B., and Fisher, C. H.  
Preparation and Physical Properties of n-Alkyl beta-n-Alkoxypropionates. Journal of the American Chemical Society, vol. 69, p. 2966-2970, December 1947.

Additional members of the homologous series  $\text{FOCH}_2\text{CH}_2\text{COOCH}_3$ ,  $\text{CH}_3\text{OCH}_2\text{CH}_2\text{COOR}$ , and  $\text{ROCH}_2\text{CH}_2\text{COOR}$  ( $\text{R} = n\text{-alkyl}$ ) were prepared (1) by adding an n-alkanol to n-alkyl acrylate or (2) by adding the alcohol to acrylonitrile followed by alcoholysis of the resulting beta alkoxy propionitrile. Densities, refractive indices, boiling points at various pressures, viscosities, and water solubilities of the beta alkoxy propionates were determined. Relationships between these properties and molecular weight are given.

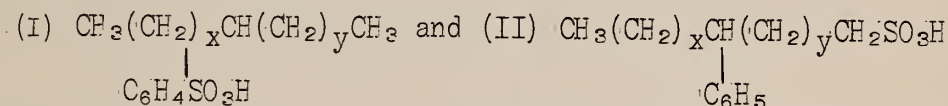
- 259 Rogers, Jerome S.  
Potential Sources of Domestic Vegetable Tannins. The Chemurgic  
Digest, vol. 6, p. 281 and 283-291, October 15, 1947.

Investigations looking toward the development of more adequate supplies of domestic tannins are briefly reviewed. The most important potentially available supplies of bark, including oak, hemlock, and mangrove, which are not being fully utilized as sources of tannin, are discussed, and the part that such tannins might play in meeting domestic needs is pointed out. Growing annual or biennial crop tannins, such as canaigre and sumac, is suggested as a possible means of increasing domestic tannin production and reducing this country's dependence on foreign supplies.

260 Schaeffer, B. B., and Stirton, A. J.

Aliphatic and Aromatic Sulfonates of Phenyl octadecane. Journal of the American Chemical Society, vol. 69, p. 2071-2072, August 1947.

Methods suitable for use in the preparation of the barium salts of the two isomeric sulfonic acids



are described. Certain properties of the intermediate and final products are also given.

261 Skoglund, W. C., Tomhave, A. E., and Kish, A. F. (Delaware Agricultural Experiment Station), in cooperation with Kelley, Edward G., and Wall, Monroe E. (ERRL)

Carotene From Vegetable Leaf Wastes Compared With Vitamin A in Chick Rations. Delaware Agricultural Experiment Station Bulletin 268, July 1947.

Vitamin A ester, carotene in leaf meal, and carotene in an extracted and distilled concentrate fed to chicks for 12 weeks produced equal growth, feed efficiency, and mortality of chicks. Vitamin A was found in the livers of the birds fed concentrate in amounts proportional to the carotene intake.

262 Swern, Daniel

Electronic Interpretation of The Reaction of Olefins With Organic Peroxides. Journal of the American Chemical Society, vol. 69, p. 1692-1698, July 1947.

An electronic interpretation of the reaction of olefins with organic peroxides, based on the change in the nucleophilic properties of the double bond as a result of neighboring substituent groups, is proposed. By application of the principles discussed in this paper, the difference in the rates of reaction of various olefins with organic peroxides can be readily explained, and much information can be obtained regarding the positions of the double bonds in mixtures of olefins isolated from dehydration, dehalogenation, dehydrohalogenation, and olefin polymerization reactions.

263 Swern, Daniel, Billen, Geraldine N., and Knight, H. B.

Preparation of Some Polymerizable Esters of Oleic Acid With Unsaturated Alcohols. Journal of the American Chemical Society, vol. 69, p. 2439-2442, October 1947.

Eight esters of oleic acid, namely, vinyl, allyl, 2-chloroallyl, methallyl (2-methylallyl), crotyl, 1-buten-3-yl (1-methylallyl), furfuryl, and oleyl oleate, have been prepared in good yield, and some of their properties have been determined. The peroxide-catalyzed copolymerization of these esters with vinyl acetate, as well as their polymerization, has been studied.



264 Treadway, R. H.

**Industrial Utilization of Cull and Surplus Potatoes.** American Potato Journal, vol. 24, p. 361-374, November 1947.

The problem of utilizing cull and surplus potatoes is discussed. It is pointed out that the problem can be solved or alleviated by developing new and improved nonfood outlets, by converting potatoes into stable forms to permit storage for later use, and by developing efficient and economical methods of storing fresh potatoes. Present non-food uses for potatoes are described.

265 Turner, Neely (Connecticut Agricultural Experiment Station), and Saunders, D. H. (ERRL)

**A Test For Synergism Between DDT and Nicotine Bentonite in Dusts.**

Journal of Economic Entomology, vol. 40, p. 553-561, August 1947.

Mixtures of three parts of DDT and one part nicotine showed definite evidences of antagonism against the European corn borer, as did three of the four concentrations of two-to-two mixture. One concentration of two-to-two mixture and all of one part DDT and three parts nicotine showed evidences of synergism by the graphic methods of Horsfall and Wadley. However, the increased mortality as a result of the synergism was too small to be of any practical importance.

266 Wall, Monroe E., and Kelley, Edward G.

**Determination and Nature of Leaf Sterols.** Analytical Chemistry, vol.

19, p. 677-683, September 1947

Methods for the determination of unsaturated and saturated sterols in leaf meals are described. Alternative procedures using micro or macro samples and colorimetric or gravimetric techniques are given. The close relationship between time vs. density curves, absorption curves, and  $E_{\frac{1}{1}}^{1\%}$  cm. of the color reaction product is demonstrated.

267 Willits, C. O.

**The Role of The Analytical Chemist in Agricultural Chemical Research.**

Analytical Chemistry, vol. 19, p. 823, November 1947

An editorial stating the duties of an agricultural analytical chemist and advocating a change in the college curriculum which would result in a well coordinated course in analytical chemistry.



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Patents

COPIES OF PATENTS MAY BE PURCHASED FROM THE UNITED STATES PATENT OFFICE, WASHINGTON 25, D. C.
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Filachione, Edward M , and Fisher, Charles H.

Process For The Manufacture of Phenyl and Substituted Phenyl Acrylates and Their Polymers. U.S. Patent No. 2,423,089, issued July 1, 1947.

Filachione, Edward M., and Fisher, Charles H.

Phenyl and Toly l alpha-Acetoxypropionate and Process For Their Preparation. U.S. Patent No. 2,425,523, issued August 12, 1947.

Griffin, Edward L., Jr.

Process For Obtaining Rutin From Buckwheat. U.S. Patent No. 2,425,094, issued August 5, 1947.

Woodward, Charles F., Badgett, Charles O., and Haines, Paul G.

Catalytic Vapor Phase Oxidation of Nicotine to 3,2'-Nicotyrine. U.S. Patent No. 2,432,642, issued December 16, 1947.

